

# **It Was A Dark and Stormy Night (Pilot Night IFR Decision Making)**

**Presented by**

**William J. Doyle, Jr.**

**COMINS ASEL & AMEL, CFI A&I, AGI, IGI, CFAI**

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**Federal Aviation  
Administration**



# ***The Cast of Characters - The Sequence of Events***

- **The airplane**
- **The pilot**
- **The passenger**
- **The flight request and flight planning**
- **The weather**
- **The Go/No-go Decision**
- **The happenings**
- **The Post Mortem Review**



# *The Airplane*



- **Type:** 1978 C182Q, N9XXXX
- **Fuel:** 88 gallons useable
- **Equipment:**
  - VOR #1 with glideslope
  - VOR #2 without glideslope
  - GPS with Moving Map
  - Stormscope
  - DME
  - ADF
  - Digital Transponder
  - Auto-Pilot coupled to HDG and Nav

# *The Pilot*



- **Name: George Jetson**
- **FAA Certificates and Ratings:**
  - Private Pilot Certificate ASEL
  - Instrument Rating (received two months prior to flight)
- **Total Time: 400 hours**
- **Time in Actual IMC: 15 hours**

*Based on a Hanna-Barbera cartoon character, 1962.*

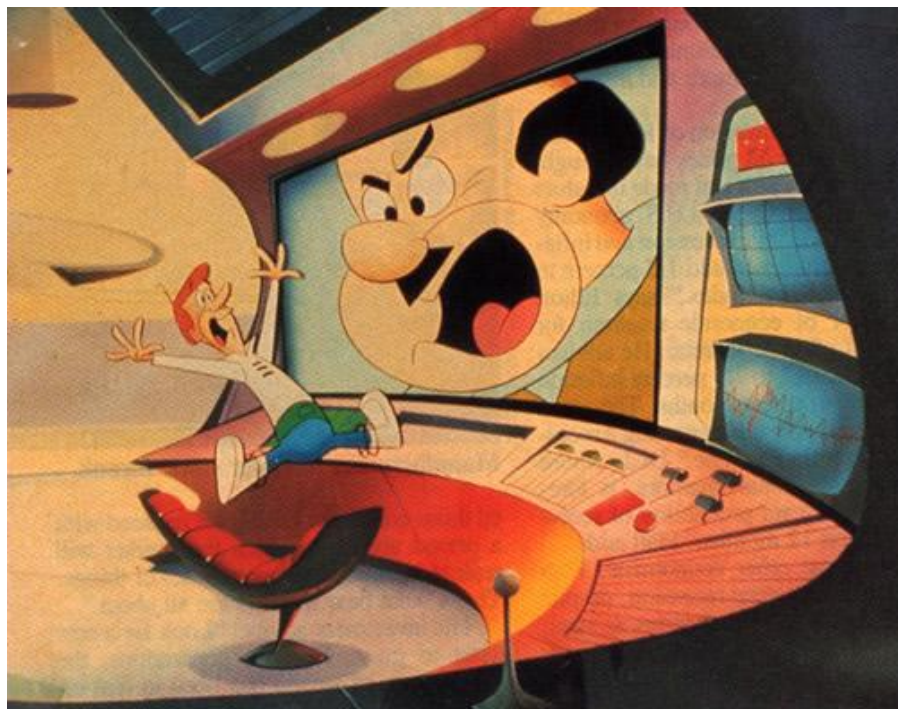
# *The Passenger*



- **Name: Mr. Spacely**
- **FAA Certificates and Ratings:**
  - None
- **Role:**
  - CEO of Spacely Sprockets
  - George's boss
- **Attitude**
  - Assertive and overbearing
  - Used to getting his own way

*Based on a Hanna-Barbera cartoon character, 1962.*

# *The Flight Request*



- **Spacely:**
  - “Jetson, get a plane and fly me from Doylestown to Carlisle.”
- **Jetson:**
  - “Mr. Spacely, the weather is going to be bad. It’s that time of year.”
- **Spacely:**
  - “Jetson, I want results not excuses. Now either get the plane or get another job!”

*Based on a Hanna-Barbera cartoon character, 1962.*



# The Flight Plan Filing



U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR			TIME STARTED		SPECIALIST INITIALS	
FLIGHT PLAN		<input type="checkbox"/> STOPOVER						
1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE / SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE	
<input type="checkbox"/> VFR	N355CP	C182T/G	135 KTS	KDYL	PROPOSED (Z)		ACTUAL (Z)	
<input checked="" type="checkbox"/> IFR					2300			
<input type="checkbox"/> DVFR							6000	
8. ROUTE OF FLIGHT								
PTW V12 HAR								
9. DESTINATION (Name of airport and city)			10. EST. TIME ENROUTE		11. REMARKS			
N94			HOURS: 01 MINUTES: 00					
12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)		14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE			15. NUMBER ABOARD	
HOURS: 05 MINUTES: 30					George Jetson, on file at KDYL 2153400707 KDYL			2
					17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)			
16. COLOR OF AIRCRAFT		CIVIL AIRCRAFT PILOTS: FAR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed \$1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.						
W/B/R								

FAA Form 7233-1 (8-82)  
Electronic Version (Adobe)

CLOSE VFR FLIGHT PLAN WITH \_\_\_\_\_ FSS ON ARRIVAL

FAA Team Pilot Decision Making - Night IFR

January 1, 2009



Federal Aviation  
Administration

# The Weather Briefing



## Lockheed-Martin AFSS



### FD Winds Aloft Forecast

FT	3000	6000	9000
JFK	0945	1040-01	1050-04
AVP	1037	1251-04	1252-07
ACY	1142	1239+01	1247-02
EMI	0936	0938-01	0949-03
PSB		1150-03	1154-06

- Wx along the route of flight:
  - Ceilings 1,000 ft
  - Visibility 2 SM
  - See winds and temperatures aloft chart
- Wx at Doylestown, PA (DYL):
  - METAR KDYL 192156Z AUTO 06016KT 3SM BR OVC 010 M01/M02 A2999 RMK AO2 SLP156 TM013M022
- Wx at Carlisle, PA (N94)
  - No Wx reporting facilities at N94
  - METAR KCXY 192156Z 07017KT 2SM BR OVC010 M01/M02 A2992 RMK AO2 SLP150 TM010M017
  - TAF AMD KMDT 191800Z 191818 11015KT 1SM BR SKC
    - FM2200 09019KT 2SM BKN010
    - FM0600 29012G25KT P6SM BKN035

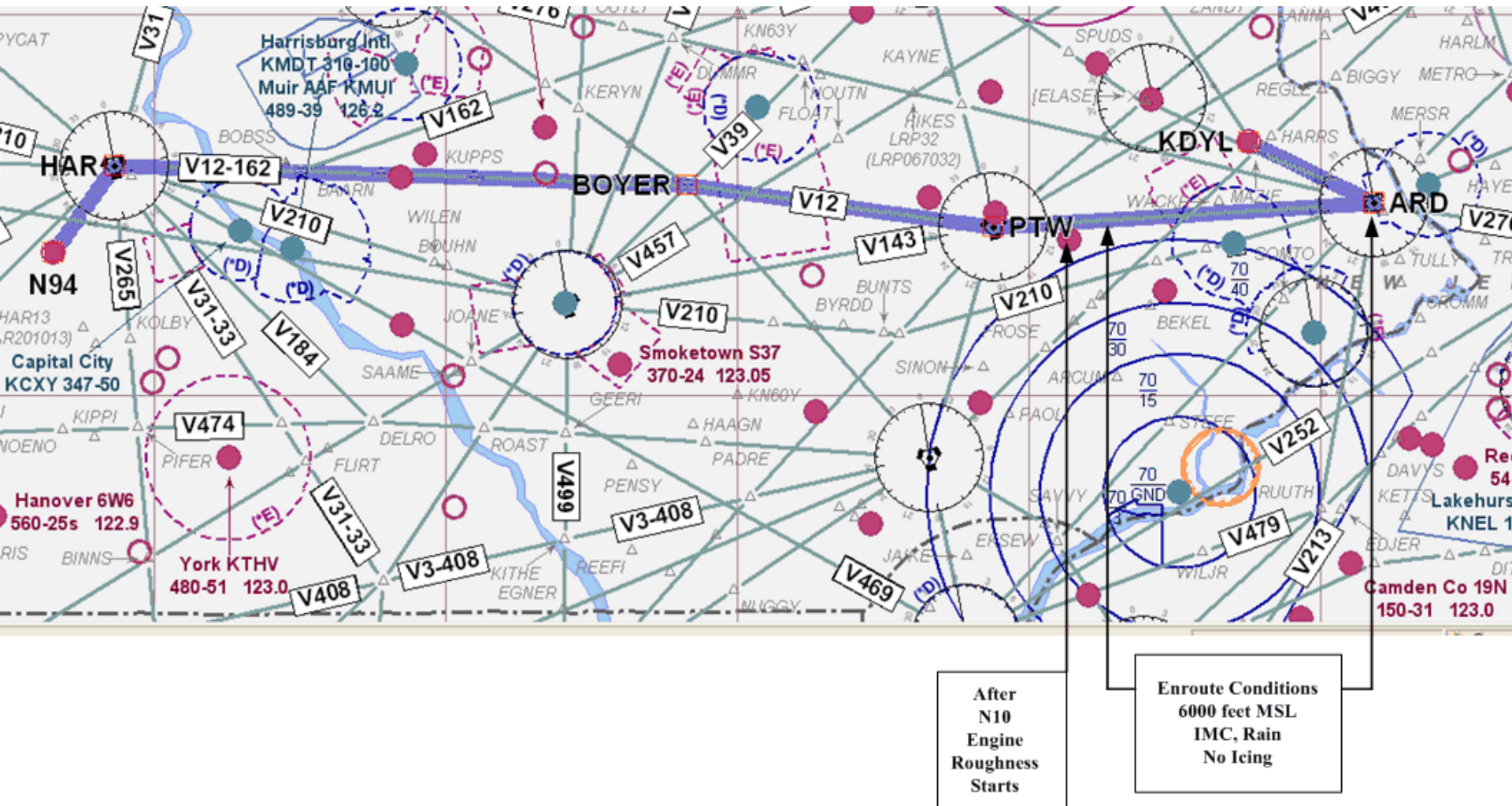
# *The Route Clearance*



- **Cessna 9XXXX is cleared from the Doylestown Airport to the Carlisle Airport via**
  - **Direct Yardley**
  - **Direct Pottstown**
  - **Victor 12 Harrisburg**
  - **Direct**
  - **Climb and maintain 3,000**
  - **Expect 6,000 one-zero minutes after departure**
  - **Departure frequency 123.8**
  - **Squawk 4666**
- **Read back correct**



# The Enroute Happenings - #1



# ***The Enroute Happenings - #1***



- **Engine roughness at night in IMC**
  - What would you do?
  - George applies carburetor heat
- **The roughness worsens**
  - What would you do?
  - George turns off the carburetor heat
- **Now what?**
  - What would you do?
  - George calls ATC and reports situation
  - ATC offers vectors for an approach and precautionary landing at Pottstown-Limerick



# ***The Enroute Happenings - #2***



- **Approach offers vectors to the LOC 28 at PTW**
  - **What would you do?**
  - **George does the following**
    - **Accepts the vectors for the approach**
    - **Does not have the approach plate handy at the start of vectoring**
      - **Passenger Spacely roots in the back for the approach plate**
    - **Fearful of more carburetor icing, flies the approach at cruise power**
    - **Does not check ASOS**
      - **Fails to realize that the winds are out of 090° at 18 knots**
      - **Does not consider a circle-to-land procedure**
    - **Does not reduce power until crossing the threshold**
    - **Floats down more than two-thirds of the runway**
    - **Initiates a go-around back into IMC**
    - **Gets vectors to the missed approach hold at GOOGL Intersection**



# The Enroute Happenings - #2



LOC I-PTW  
108.3

APP CRS  
276°

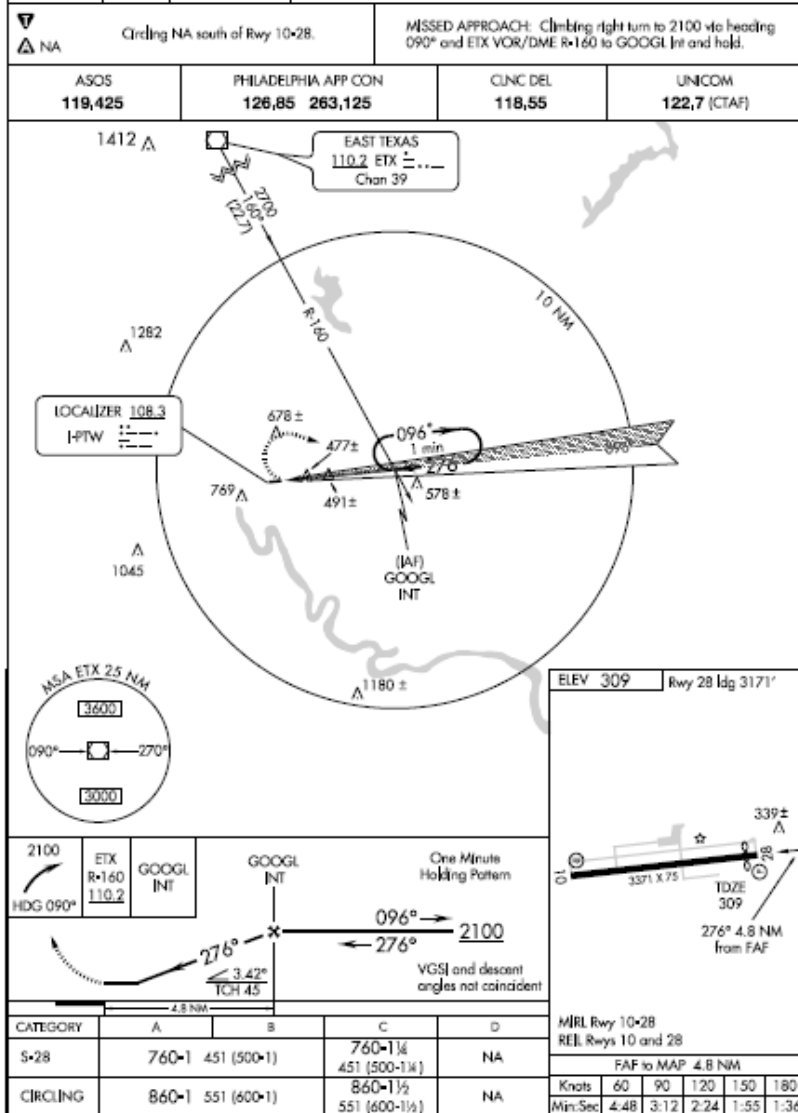
Rwy ldg  
3171

TDZE  
309

Apt Elev  
309

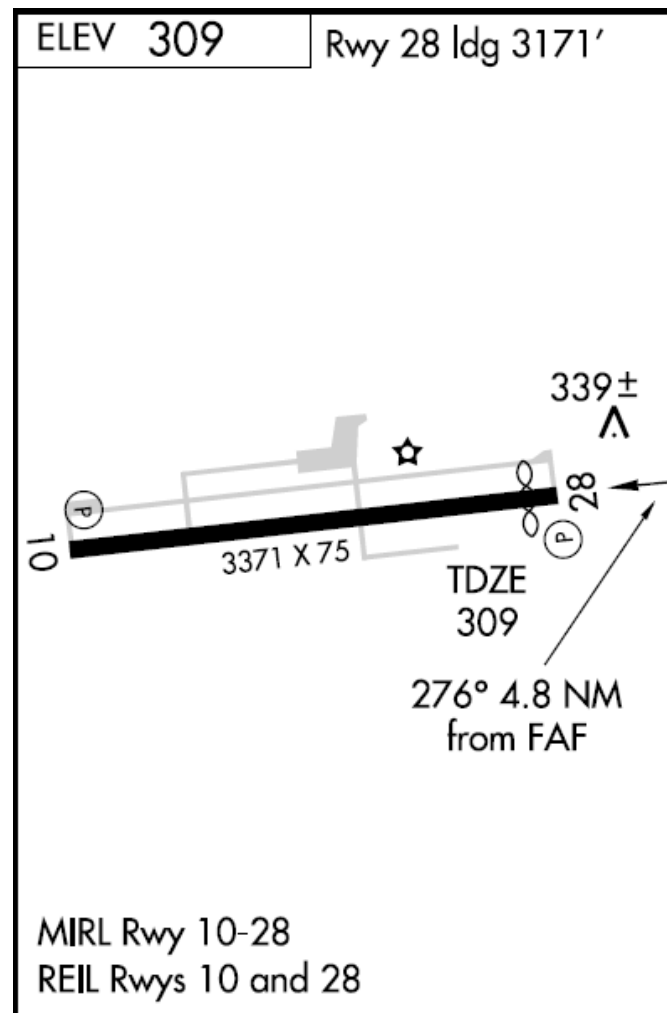
# LOC RWY 28

POTTSTOWN-LIMERICK (PTW)

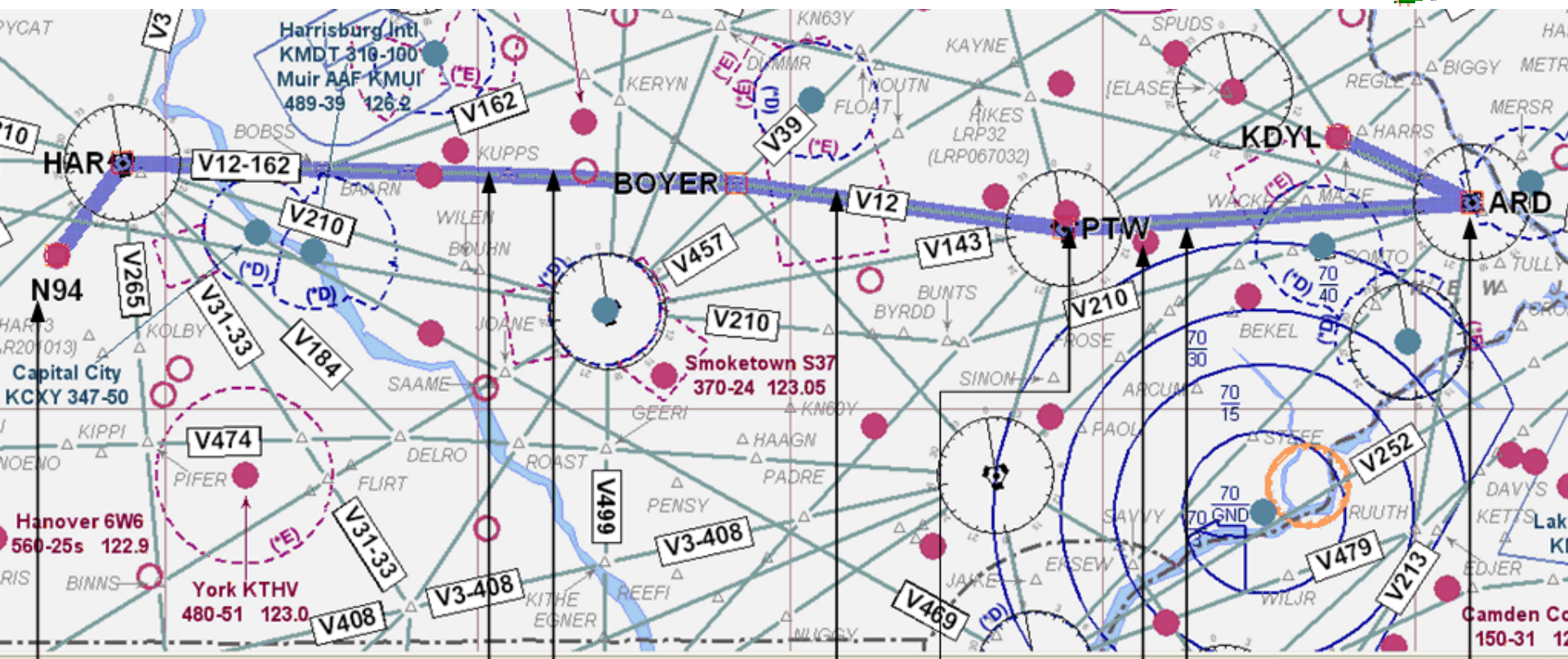


NE-4, 22 OCT 2009 to 19 NOV 2009

MISSED APPROACH: Climbing right turn to 2100 via heading 090° and ETX VOR/DME R-160 to GOOGL Int and hold.



# The Enroute Happenings - #3



Flies VOR-A  
at N94  
Engines dies  
in landing roll

Declines ATC  
offer of ILS 8  
at CXY

Enroute Conditions  
Tops at 5000 feet MSL  
Clear Above

KPTW  
LOC 28 with  
Missed  
Approach  
Engine  
Roughness  
Ended at  
GOOGL Int

After  
N10  
Engine  
Roughness  
Starts

Enroute Conditions  
6000 feet MSL  
IMC, Rain  
No Icing

# *The Enroute Happenings - #3*

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- **Approach offers vectors to the ILS 8 at CXY**
  - **What would you do?**
  - **George does the following**
    - **Declines the CXY ILS 8 approach**
    - **Requests vectors for the N94 VOR-A**
    - **Successfully completes the VOR-A approach at N94**
    - **Engine dies in the landing roll**



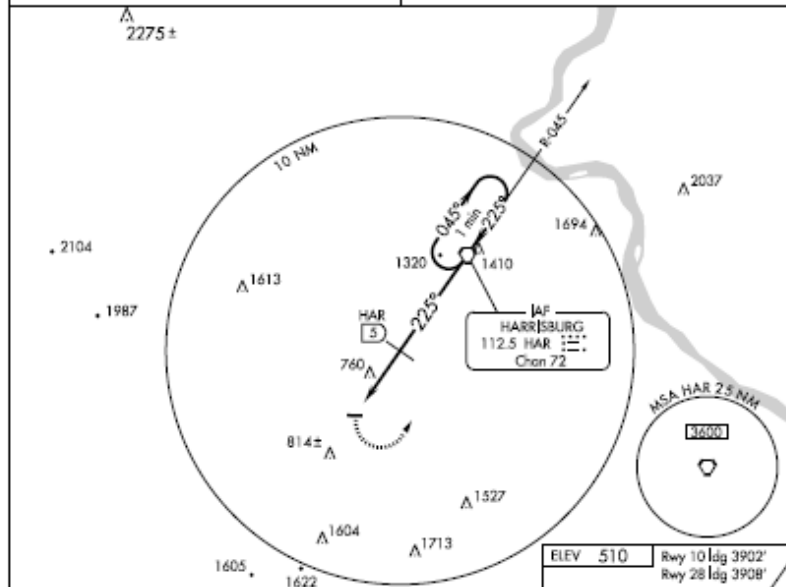
# *The Enroute Happenings - #3 – N94*



VORTAC HAR	APP CRS	Rwy ldg	N/A
112.5	225°	TDZE	N/A
Chen 72		Apr Elev	510

VOR-A  
CARLISLE (N94)

Use Harrisburg Intl altimeter setting.	MISSED APPROACH: Climbing left turn to 3000 direct HAR VORTAC and hold.
HARRISBURG APP CON 124.1 273.525	UNICOM 122.8 (CTAF) 0



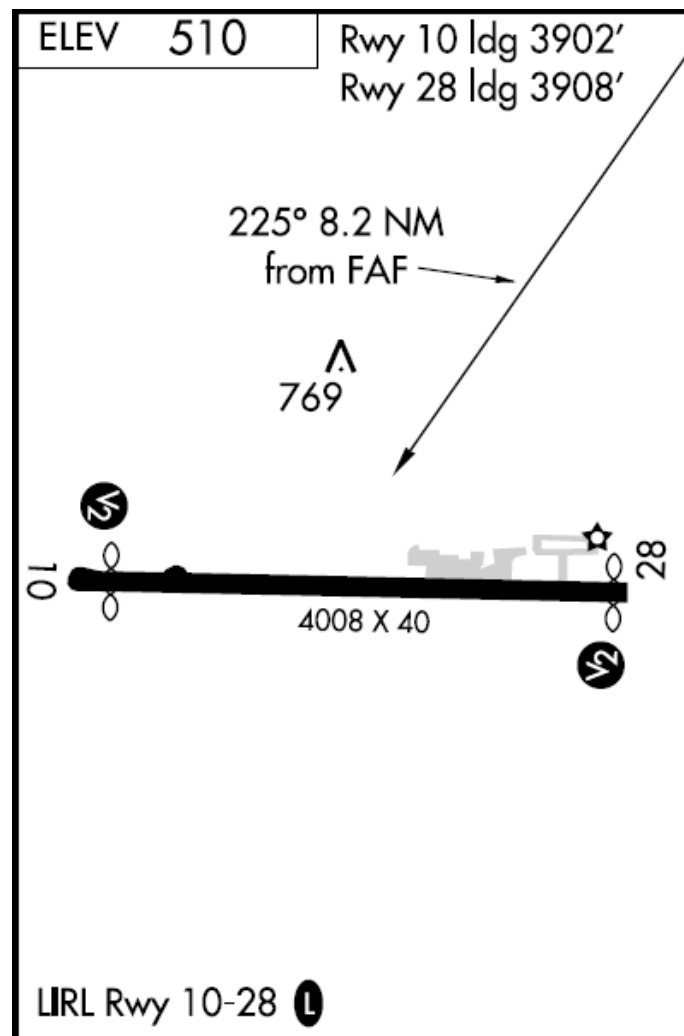
3000	HAR	112.5	VORTAC	One Minute Holding Pattern	045°	3000	225°	3000
1860	8.2	225°	1860	3.2	5 NM			
CATEGORY	A	B	C	D				
CIRCLING	1860-1 1/4 1350 (1400-1 1/4)	1860-1 1/2 1350 (1400-1 1/2)	1860-3 1350 (1400-3)	NA				
DME MINIMUMS								
CIRCLING	1200-1 690 (700-1)	1200-2 690 (700-2)	NA					
FAF to MAP 8.2 NM								
Knots	60	90	120	150	180			
Min:Sec	8:12	5:28	4:06	3:17	2:44			

CARLISLE, PENNSYLVANIA  
Orig-A 08241

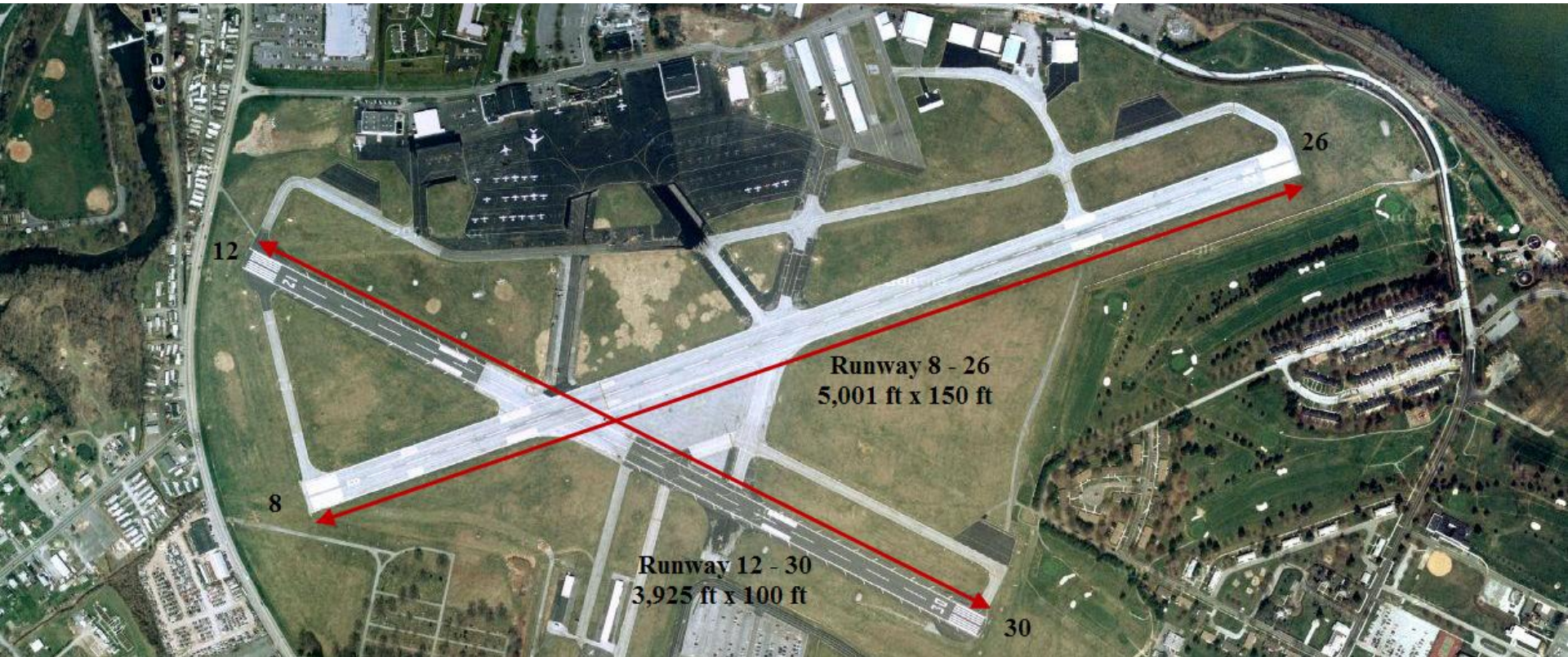
40°11'N - 77°10'W

CARLISLE (N94)  
VOR-A

MISSED APPROACH: Climbing left turn to 3000 direct HAR VORTAC and hold.



# *The Enroute Happenings - #3 – KCXY*



LOC I-CXY  
109.1

APP CRS  
082°

Rwy Idg  
5001

TDZE  
342

Apt Elev  
347

ILS or LOC RWY 8  
HARRISBURG / CAPITAL CITY (CXY)

⚠ Circling to Rwy 12-30 NA at night.  
Inoperative table does not apply to S-ILS-B.  
For inoperative MALS, increase S-LOC-B Cat A visibility to 1 mile.  
HORVIFix minimums: For inoperative MALS, increase S-LOC-B  
Cat A and B visibility to 1 mile. Visibility reduction by helicopters NA.  
Autopilot coupled approach NA below 940. When local altimeter  
setting not received, use Harrisburg Int altimeter setting.



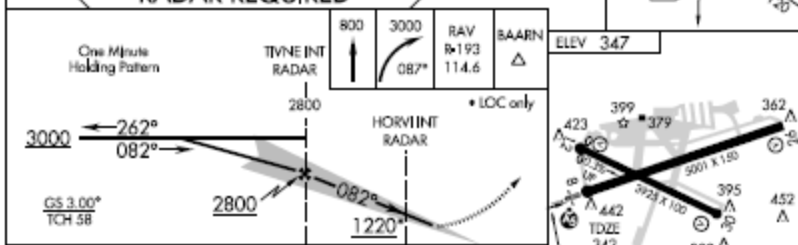
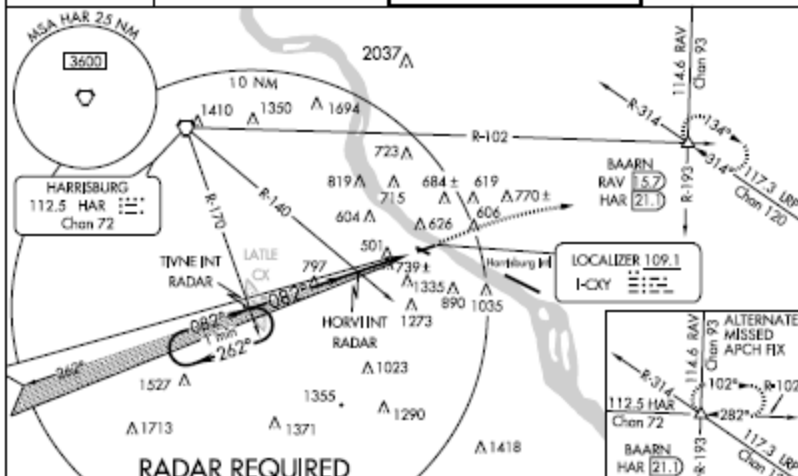
MALSR  
MISSED APPROACH: Climb to 800 then  
climbing right turn to 3000 via heading 087°  
and RAV VORTAC R-193 to BAARN INT/  
RAV 15.7 DME and hold.

ATIS  
134.95

HARRISBURG APP CON  
124.1 273.525

CAPITAL CITY TOWER \*  
119.5 (CTAF) 0 257.8

GND CON  
121.9



Category	A	B	C	D
S-ILS B	592-3/4	290 (300-1/4)		
S-LOC B	1220-3/4 878 (900-3/4)	1220-2 878 (900-2)	1220-2 1/4 878 (900-2 1/4)	
CIRCLING	1260-1 1/4 913 (1000-1 1/4)	1700-1 1/2 1353 (1400-1 1/2)	1700-3 1353 (1400-3)	
HORVIFIX MINIMUMS				
S-LOC B	1000-3/4 658 (700-3/4)	1000-1 1/4 658 (700-1 1/4)	1000-1 1/2 658 (700-1 1/2)	
CIRCLING	1260-1 1/4 913 (1000-1 1/4)	1700-1 1/2 1353 (1400-1 1/2)	1700-3 1353 (1400-3)	

HARRISBURG, PENNSYLVANIA

Amdt 11 08325

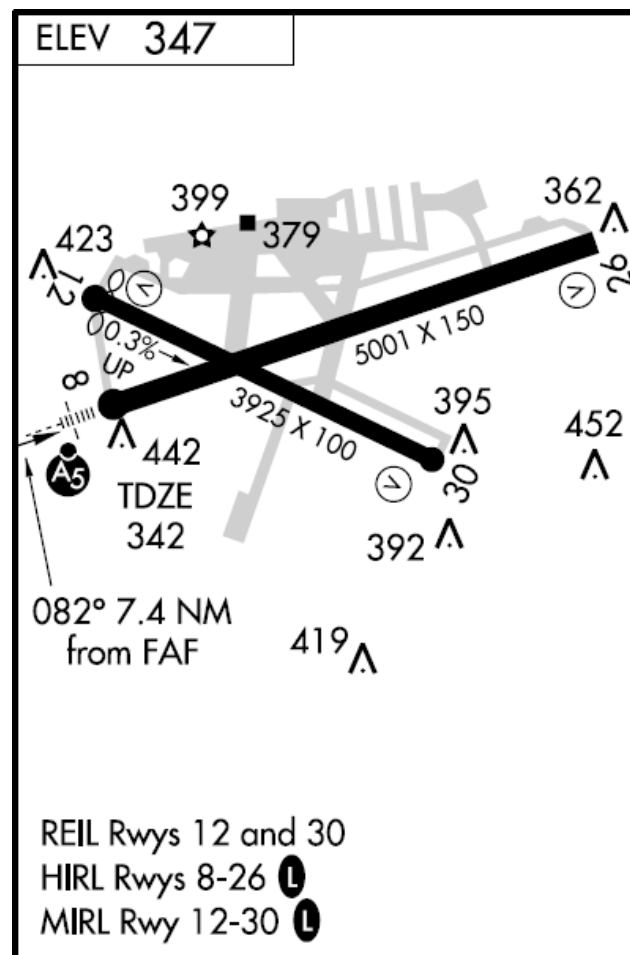
40°13'N - 76°51'W

HARRISBURG / CAPITAL CITY (CXY)

ILS or LOC RWY 8

NE-4, 22 OCT 2008 to 19 NOV 2009

**MISSED APPROACH:** Climb to 800 then climbing right turn to 3000 via heading 087° and RAV VORTAC R-193 to BAARN INT/RAV 15.7 DME and hold.



# *Post Mortem Review*

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- *Review of FAR 91.3*
- *Review of FAR 91.103*
- *Review of FAR 91.167*
- *Review of Pilot's Decisions*
  - *Go/No-go*
  - *Carburetor heat*
  - *Selection of destination airport*



# *Review of FAR 91.3*

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- **FAR 91.3**
  - **Responsibility and authority of the pilot in command.**
    - a) **The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.**
    - b) **In an in-flight emergency requiring immediate action, the pilot in command may deviate from any rule of this part to the extent required to meet that emergency.**
    - c) **Each pilot in command who deviates from a rule under paragraph (b) of this section shall, upon the request of the Administrator, send a written report of that deviation to the Administrator.**
- **What should George have done regarding Mr. Spacely?**



# Review of FAR 91.103



- **FAR 91.103 - Preflight action.**
  - Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include --
    - (a) For a flight under IFR or a flight not in the vicinity of an airport, weather reports and forecasts, fuel requirements, alternatives available if the planned flight cannot be completed, and any known traffic delays of which the pilot in command has been advised by ATC;
    - (b) For any flight, runway lengths at airports of intended use, and the following takeoff and landing distance information:
      - 1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and
      - 2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature.
- **Is there anything that George missed?**
  - Should George have planned an alternate?
  - What does FAR 91.167 say?



# Review of FAR 91.167



- a) No person may operate a civil aircraft in IFR conditions unless it carries enough fuel (considering weather reports and forecasts and weather conditions) to –
- 1) **Complete the flight to the first airport of intended landing;**
  - 2) Except as provided in paragraph (b) of this section, **fly from that airport to the alternate airport** and
  - 3) **Fly after that for 45 minutes at normal cruising speed** or, for helicopters, fly after that for 30 minutes at normal cruising speed.
- b) **Paragraph (a)(2) does not apply if:**
- 1) Part 97 of this chapter prescribes a standard instrument approach procedure to, or a special instrument procedure has been issued by the Administrator to the operator for, the first airport of intended landing; and
  - 2) **Appropriate weather reports or weather forecasts, or a combination of them, indicate the following (**the 1-2-3 Rule**)**
    - i. **For aircraft other than helicopters. For at least 1 hour before and for 1 hour after the estimated time of arrival, the ceiling will be at least 2,000 feet above the airport elevation and the visibility will be at least 3 statute miles**



VORTAC HAR  
112.5  
Chan 72

APP CRS  
225°

Rwy Idg  
TDZE  
Apt Elev

N/A  
N/A  
510

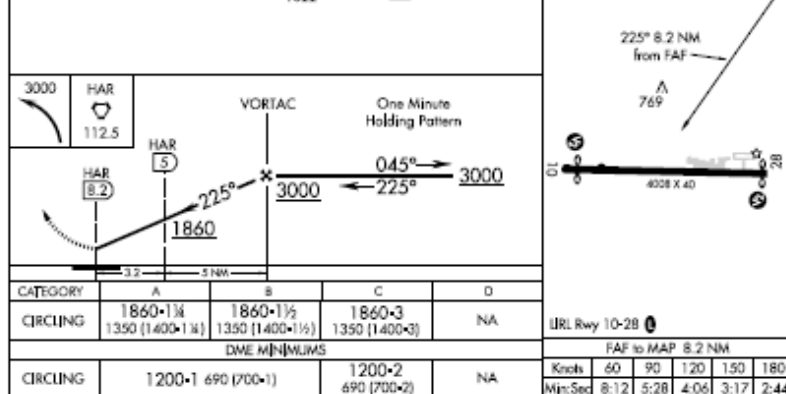
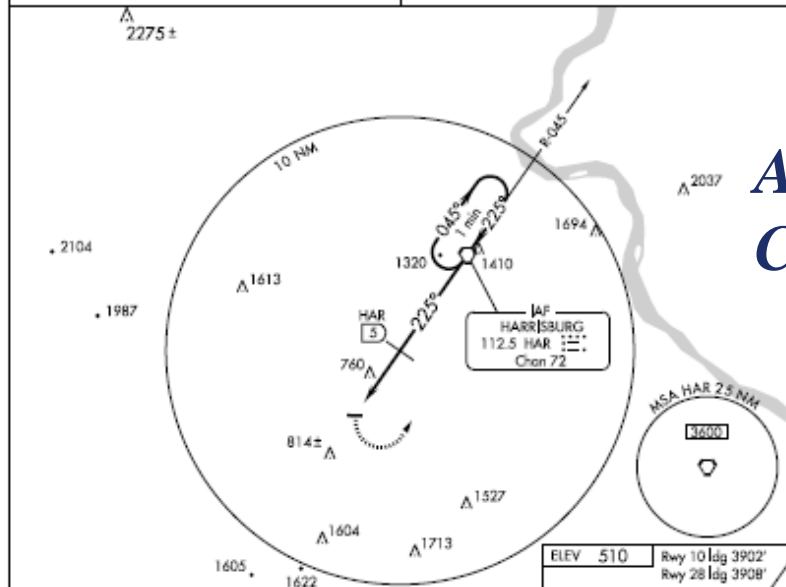
VOR-A  
CARLISLE (N94)

Use Harrisburg IIR altimeter setting.

MISSED APPROACH: Climb left turn to 3000 direct HAR VORTAC and hold.

HARRISBURG APP CON  
124.1 273.525

UNICOM  
122.8 (CTAF) 0



CARLISLE, PENNSYLVANIA  
Orig-A 08241

40°11'N - 77°10'W

CARLISLE (N94)  
VOR-A

## Approach Comparison

ILS or LOC RWY 8  
HARRISBURG / CAPITAL CITY (CXY)

LOC 1-CXY  
109.1

APP CRS  
082°

Rwy Idg  
TDZE  
Apt Elev

5001  
342  
347

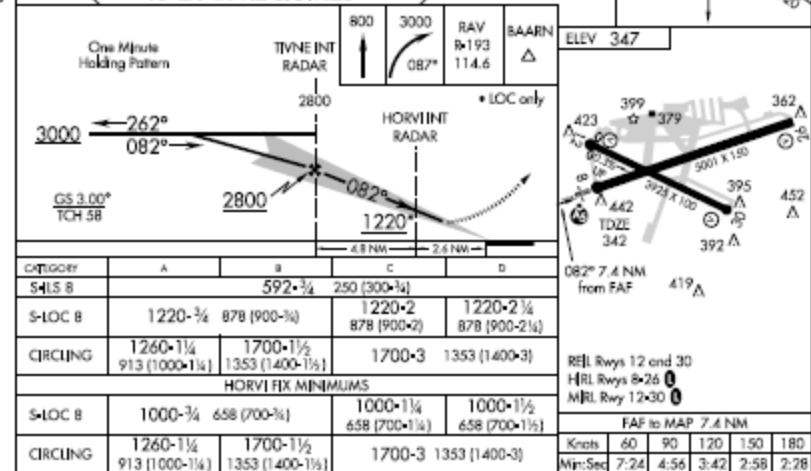
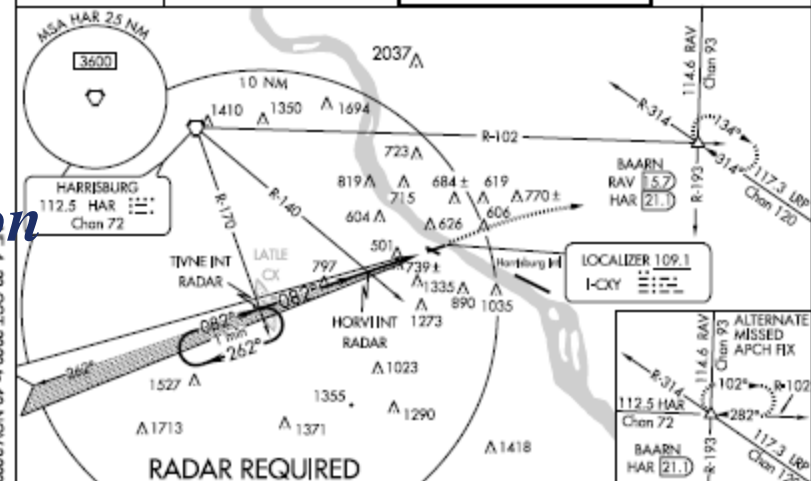
MALS R  
MISSED APPROACH: Climb to 800 then climbing right turn to 3000 via heading 087° and RAV VORTAC R-193 to BAARN INT/ RAV 15.7 DME and hold.

ATIS  
134.95

HARRISBURG APP CON  
124.1 273.525

CAPITOL CITY TOWER \*  
119.5 (CTAF) 0 257.8

GND CON  
121.9



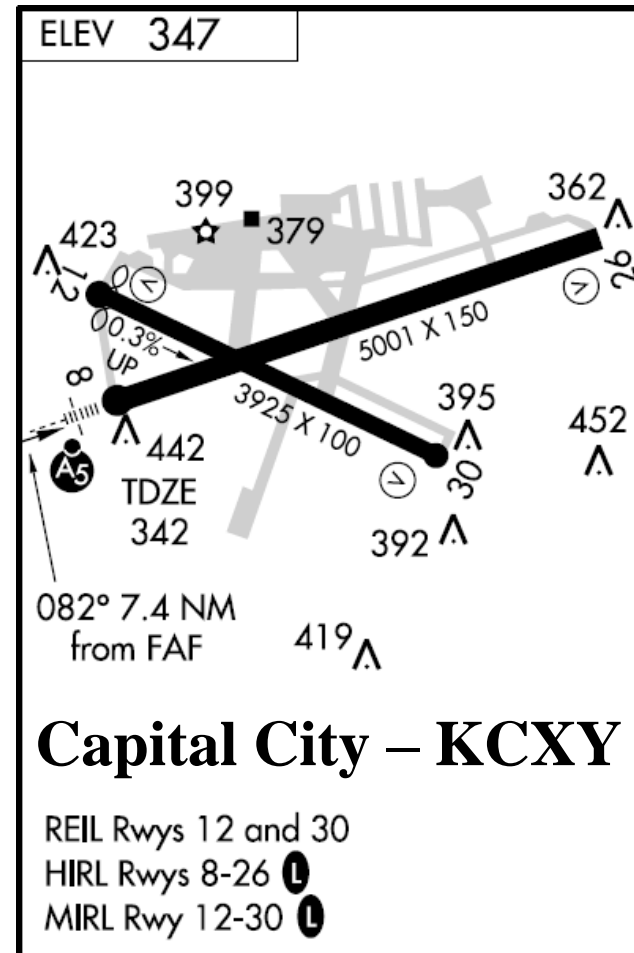
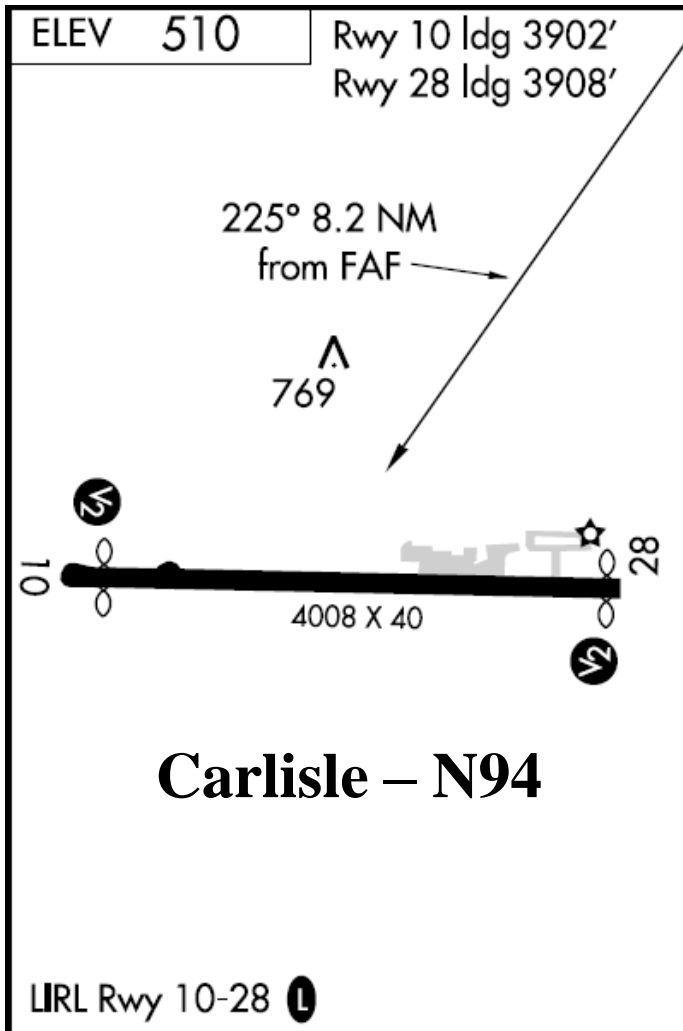
HARRISBURG, PENNSYLVANIA  
Amdt 11 08325

40°13'N - 76°51'W

HARRISBURG / CAPITAL CITY (CXY)  
ILS or LOC RWY 8



# Airport Comparison



# ***AOPA Air Safety Foundation***

## ***on Carburetor Icing***

- **At the first indication of carburetor ice**
  - Apply full carburetor heat
  - LEAVE IT ON
- **The engine may run rougher as the ice melts and goes through it**
  - but it will smooth out again
- **When the engine runs smoothly**
  - Turn off the carburetor heat
- **If you shut off the carburetor heat prematurely**
  - the engine will build more ice
  - and probably quit because of air starvation



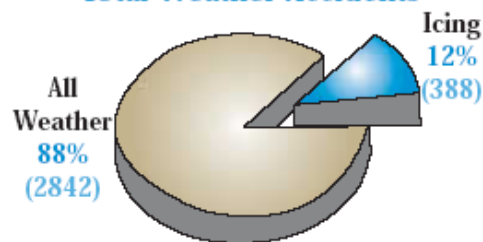
# AOPA Air Safety Foundation

## Weather Accident Statistics

### The Stats:

1990-2000 27% (105 accidents) involved fatalities

#### Total Weather Accidents



#### Structural Icing

40% (153)

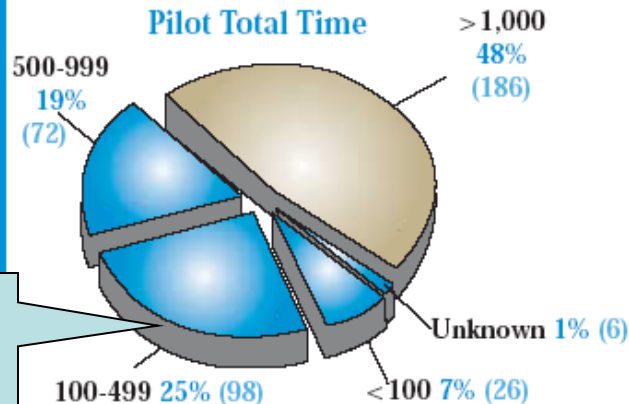
#### Leading Factors

Ground Accumulation 8% (32)

Induction Icing 52% (203)

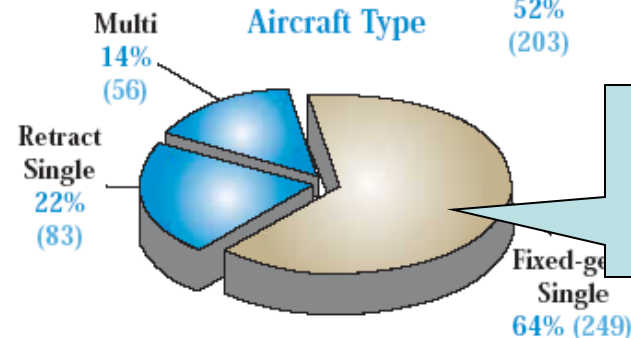
**George's Problem**

#### Pilot Total Time



**George Jetson**

#### Aircraft Type



**C182Q NXXXX**

Source: AOPA Air Safety Foundation accident databases

**Induction icing (carburetor ice) was a leading factor in 52% of the weather accidents that occurred between 1990 and 2000.**

# *What Would You Have Done?*

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- *What would have been your weather decision?*
  - *Would you have gone during the day?*
  - *Have you established personal minimums for yourself?*
- *How would you have prepared for the actual flight?*
  - *How would you have organized charts and plates in the cockpit?*
- *How would you have handled the enroute diversion?*
- *How would you have handled the rest of the trip?*
  - *What airport would you have picked?*
  - *Why?*



# *The Three Most Useless Things to a Pilot*

- **The runway behind you**
  - **Moral:** know your aircraft's take-off minimums and cross-wind component, your airport's runway length, density altitude, any obstacles to be cleared
- **The altitude above you**
  - **Moral:** know your aircraft's power settings for climb, cruise, and descent
- **The fuel on the ground below you**
  - **Moral:** know your aircraft's fuel capacity, fuel system, GPH burn rate, and winds aloft for the route of flight.
- **Utilize superior judgment to avoid needing to use superior skill**

# *Quick Guide to Decision Making*

- **If you're not sure it is within the capabilities of the airplane**
  - Don't do it!
- **If you're not sure it is within your capabilities**
  - Don't do it!
- **Think before attempting Single Pilot IFR, especially at night**
  - Night Single Pilot IFR is below my personal minimums
- **Establish personal minimums for yourself**
  - Stay with them!



# Credits and Information



# *Downloading Training Materials*

- **Downloading This Presentation**
  - [http://williamjdoylejr.net/FAAST/dark\\_and\\_stormy\\_night.ppt](http://williamjdoylejr.net/FAAST/dark_and_stormy_night.ppt)
  - <http://williamjdoylejr.net/FAAST>



# About the Presenter

- **Aviator**
  - Commercial, Instrument, ASEL & AMEL
  - 2,800 hours total time; 650 hours TAA; 500 hours KFC 150; 550 hours Garmin 430, 100 hours Garmin G1000
- **Instructor**
  - CFI A&I, AGI, IGI, ASC
  - 1,275 hours as CFI
  - Cessna FITS Course and CFAI Course
  - FAA PHL FSDO CFI of the Year 2009-2010
- **Civil Air Patrol**
  - Instructor-Pilot and Check-Pilot
  - G1000 Project Officer
- **Technologist & Teacher**
  - Director of Technical Services, Hatboro-Horsham School District
  - Nursing Informatics Instructor, La Salle University Graduate School of Nursing
- **Author**
  - Two books on electronic spreadsheets, with a Russian translation
  - Self-study manuscript on computer concepts for nurses
  - Articles on gear up landings and fuel management published by FAA



# Just a Real Nice Picture



# FAASTeam Pilot Decision Making

**Questions?**

**Comments?**

**Ideas?**



# **This Completes Pilot Decision Making Night IFR**



**Be sure to have your attendance record validated!**